PRODUCT CONDENSED CATALOG

Accurate, Reliable Measurement Solutions

Airflow, Temperature, Psychrometric, CO_2, and Occupancy for HVAC Systems

ebtron.com

EBTRON®
a measurable difference!

CUSTOMER PROFILE

Fortune 500 Companies
K-12 Schools
Universities
Healthcare & Medical Facilities
Government Buildings
Laboratories & Clean Rooms
Data Centers
Museums, Galleries & Libraries
Airport & Cruise Terminals
Arenas
Courthouses

APPLICATIONS

AHU Outdoor Air Delivery Monitoring
DOAS Outdoor Air Delivery Monitoring
DCV Outdoor Airflow Limit Control
CO_2/Airflow Population Estimation
Differential Airflow Tracking
ERV/HRV Airflow Tracking
Laboratory & Hospital Pressurization
Air Change Performance Monitoring
Low Airflow VAV Terminal Measurement
Fault Detection Monitoring

BENEFITS

Comply with ASHRAE Standards
Demonstrate Code Compliance
Satisfy LEED Prerequisites and Credits
Provide Acceptable IAQ
Save Energy
Reduce Liability
Improve Building Performance

EBTRON®
a measurable difference!

THERMAL DISPERSION TECHNOLOGY

Thermal dispersion airflow measurement was pioneered by EBTRON in the early 1980's. Since then, the Company has continuously refined and improved its technology and products. Today, EBTRON manufactures the highest quality airflow meters available and is arguably the leader in airflow measurement technology.

Thermal dispersion relates the velocity of the air to the power and rise in temperature of a heated element in a moving air stream. EBTRON uses precision, bead-in-glass thermistor probes to measure the airflow rate and air temperature. Multiple sensing points are used to produce an average velocity for true volumetric or mass airflow. Each individual sensor node is calibrated to NIST traceable airflow standards at up to 16 points resulting in a sensor accuracy of 2% of reading.

THE LEADER IN AIRFLOW MEASUREMENT

EBTRON's engineering design team continuously tests and improves its products. Product testing is conducted in environmental chambers to evaluate performance under the environmental limits that the transmitter and sensor probe will encounter. Sensor node assemblies are tested by an independent laboratory to demonstrate survival in high-salt and atmospheric acid environments.

EBTRON maintains a computer-controlled manufacturing system with more than 30 automated calibration and quality checkpoints. Every sensor node is independently calibrated against NIST traceable standards in custom designed and automated calibration wind tunnels. Precision bead-in-glass thermistor probes manufactured to EBTRON specifications undergo a rigorous aging process to ensure long-term stability and high reliability under self-heat conditions. The ruggedized bead-in-glass design differentiates EBTRON from competitors that use less stable, "chip" type thermistors. High performance transmitters undergo electrical burn-in prior to calibration and use only the highest quality industrial grade components to provide for additional reliability.

The result is unparalleled performance and reliability that meets the demands of today's high-tech green buildings.

SPECIFY EBTRON ON YOUR NEXT PROJECT!

- √ Specify EBTRON thermal dispersion technology.
- √ Exclude differential pressure devices including pitot tubes, pitot arrays, piezo rings and devices that measure the pressure drop across a louver or obstruction.
- √ Require that each sensor node uses two bead-in-glass thermistors and exclude devices that use any type of chip thermistor.
- √ Demand that each sensor is individually calibrated to NIST traceable airflow and temperature standards.

Model Comparisons

Advantage IV / *EB-Flow II*

	GTx116e-PC	GTx116e-P+	HTx104-PE	HTx104-T	EF-x2000-T	EF-x1000-T	EF-x2000-U	GTx108e-F/An	GTx108e-F /SI & /DI	HTx104-F /SI & /DI	HTx104-B	EF-x2000-B
Thermal Dispersion Sensor Node Assembly	DUCT & PLENUM PROBES							FAN INLETS			BLEED	
Bead-in-glass Self-heated Thermistor	•	•	•	•	•	•	•	•	•	•	•	•
Bead-in-glass Temperature Sensor	•	•	•	•	•	•	•	•	•	•	•	•
Maximum Sensor Nodes per Transmitter	16	16	4	2	2	2	2	8	4	4	1	1
Maximum Probes per Transmitter	4	4	2	1	1	1	2	8	4	4	1	1
Maximum Sensors/Probe	8	8	4	2	2	2	1	1	1	1	1	1
Humidity Sensor Assembly (Requires /H Option)												
Ruggedized Capacitive Polymer Sensor	•											
Maximum Sensor Assemblies per Transmitter	1											
Mounting Options												
Duct & Plenum Probes												
Insertion, Internal and Standoff (Round, Rectangle, Oval)	•	•	•									
Insertion (Round)				•	•	•						
Insertion and Standoff (Universal Mounting)							•					
Fan Inlets (Adjustable)												
Fan Throat Mount (Traditional Brackets)									•	•		
Fan Face Mount (Traditional Brackets)								•	•	•		
Fan Forward Mount (Traditional Brackets)								•	•	•		
Backdraft Damper Mount (Traditional Brackets)								•	•	•		
"Bleed" Airflow Sensors - 1/2" NPT Female Connections											•	•
Probe to Transmitter Connections												
FEP Plenum Rated Cable (10 ft. standard, up to 50 ft.)	•	•	•	•	•	N/A	•	•	•	•	•	•
Airflow Measurement												
NIST Traceable Calibration Standard	•	•	•	•	•	•	•	•	•	•	•	•
Individual Sensor Node Accuracy (% of reading)	±2	±2	±2	±3	±3	±3	±3	±2	±2	±2	±2	±2
Installed Accuracy without Adjustment (% of reading)[1]	±3	±3	±3/10	±3	±3	±3	< ±15	< ±10	< ±10	< ±10	N/A	N/A
Adjusted Accuracy to Third Party Reference (% of reading)	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	N/A	N/A
Airflow Measurement Range (Min/Max FPM)	0/5000	0/5000	0/5000	0/3000	0/2000[2]	0/2000[2]	0/2000[2]	0/10000	0/10000	0/10000	±3000	±2000[2]
Temperature Measurement												
NIST Traceable Calibration Standard	•	•	•	•	•	•	•	•	•	•	•	•
Velocity Weighted Temperature	•	•	•	•	•	•	•	•	•	•	N/A	N/A
Sensor Node Accuracy (°F)	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15
Humidity Measurement (Requires /H Option)	DUCT & PLENUM PROBES							FAN INLETS			BLEED	
Accuracy @ 77°F (%RH, 20 to 80%RH/<20 and >80%RH)	±2/3.5											
Temperature Coefficient (%/°F)	0.07											
Long Term Drift (%RH/year)	0.5											
Velocity Weighted RH and Enthalpy	•											
Dewpoint	•											
Alarm Capability												
High/Low Airflow Alarms	•	•	•	•	•		•	•	•	•	•	•
Fan Airflow Alarm								•				
System Status Alarm	•	•	•	•	•		•	•	•	•	•	•
Contact Closure Alarm Relay (Assignable)					•		•					•
Display												
16 Character x 2 Row Alpha-numeric LCD (backlit)	•	•						•	•			
16 Character x 1 Row Alpha-numeric LCD (non backlit)			•	•	•		•			•	•	•

Model Comparisons

Advantage IV / *EB-Flow II*

	GTx116e-PC	GTx116e-P+	HTx104-PE	HTx104-T	EF-x2000-T	EF-x1000-T	EF-x2000-U	GTx108e-F/An	GTx108e-F /SI & /DI	HTx104-F /SI & /DI	HTx104-B	EF-x2000-B
Connectivity Options (Model code placeholder x=A, B, C, F, M, N, or U)												
Linear Analog Output Signals (AO1, AO2, AO3)[3]	A,B,C,F, M,U	A,B,C,F, M,U	A	A	A	A	A[4]	A,B,C,F, M,U	A,B,C,F, M,U	A	A	A
RS-485 BACnet/Modbus	B,C	B,C	N	N	N	N	N	B,C	B,C	N	N	N
Ethernet BACnet/Modbus	B,M	B,M						B,M	B,M			
Lonworks Free Topology	F	F						F	F			
USB "Thumb Drive" Datalogger	U	U						U	U			
Phone/Tablet Applications (Free Download for Android® and iOS systems®)												
EB-Link Reader w/Bluetooth® low energy Interface	•	•						•	•			
Operating Ranges												
Probe Temperature Range (Min/Max °F)	-20/160	-20/160	-20/160	-20/160	-20/160[2]	-20/120[2]	-20/160[2]	-20/160	-20/160	-20/160	-20/160	-20/160[2]
Transmitter Temperature Range (Min/Max°F)	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120	-20/120
Probe Humidity Range (% RH, non-condensing)	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
Transmitter Humidity Range (% RH)	5/95	5/95	5/95	5/95	5/95	5/95	5/95	5/95	5/95	5/95	5/95	5/95
Listings & Ratings												
UL/cUL	•	•	•	•	•	•	•	•	•	•	•	•
CE	•	•	•	•				•	•	•	•	
UKCA	•	•	•	•				•	•	•	•	
BTL Listed (BACnet devices only)	•	•	•	•				•	•	•	•	
FCC Part-15	•	•	•	•	•	•	•	•	•	•	•	•

Note 1 - When installed in accordance to published guidelines.

Note 2 - 0/3000 FPM when minimum temp is greater than 0 °F

Note 3 - AO1=Airflow - AO2=Temperature or Alarm - AO3 (required /H option)=RH, Enthalpy, or Dewpoint

Note 4 - For dual location configurations AO1=Airflow1 (AF1), Airflow1 - Airflow2, or Airflow2 - Airflow1; AO2=Airflow2 (AF2), Airflow1 - Airflow2, or Airflow2 - Airflow1

IAQ ENFORCER® SYSTEM *EB-Bus Ethernet* SMART DISPLAY PANEL (SDP) FOR COMPATIBLE EBTRON, GREENTROL, AND APPROVED THIRD-PARTY DEVICES

Device Config | **Device Summary** | ***EB-Link* Reader** | **Live Display**

Application graphics subject to change with application enhancements and updates.

< APPS **DEVICES >**

STANDARD APPLICATIONS PROVIDED

- Device Configuration App
- Device Summary App
- EB-Link Reader App
- Live Display App

ADDITIONAL APPLICATIONS

- Visit EBTRON.com/SDPAppStore or scan the “APPS” QR Code for an up-to-date list of applications and updates

PRODUCT HIGHLIGHTS

- Manage up to twenty measurement devices from a single location
- Tablet/phone style interface with factory installed applications that can be updated and/or added over time
- 7-inch diagonal capacitive touch full color display (800x480 resolution) with a 900MHz microcomputer, 512 MB of RAM, and 8 GB of flash memory
- Compatible with EBTRON, GreenTrol, and other third-party approved *EB-Bus Ethernet* devices (visit EBTRON.com/SDPDevices or scan the “DEVICES” QR code for up-to-date devices supported)
- Dedicated Ethernet network does not interfere with BAS communications (BAS connections are made to separate analog or network outputs of each individual measuring device)
- View, configure, and diagnose multiple devices
- Bidirectional capability allows transmitters to be installed closer to the sensor probes, thus eliminating the need for extended cable lengths
- Low-cost CAT5e or higher wiring allows transmitters to be located 328 ft. [100 m] from display or Ethernet switch
- Updates and new applications can easily be added over time using a USB Type A memory device
- Three-year warranty
- Toll-free customer support for the lifetime of the product

THE IAQ ENFORCER SYSTEM

The IAQ Enforcer System was introduced by EBTRON in the mid-1990’s as a method to provide centralized access to multiple measuring devices installed in an air handler, mechanical room, or other location to facilitate use, configuration, and troubleshooting.

Today’s IAQ Enforcer System is built on multiple levels of hardware, software, and cloud based technologies. One level of technology is the Smart Display Panel Series that takes advantage of advancements in network communications, microprocessor power, and display technology to create a state-of-the-art, single point of access device to view, configure, and diagnose multiple measurement devices. In addition to the standard applications provided, new and exciting applications and tools are continuously being developed to expand the functionality of the device. Applications, tools and updates are available free of charge for download at EBTRON.com.

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SDX-1000 SMART DISPLAY PANEL

The SDX-1000 is the Ethernet version of the IAQ Enforcer® Smart Display Panel Series. The display is designed to operate on a stand-alone Ethernet network between the display and up to twenty compatible devices[1,2]. Connected devices with a single Ethernet port require an Ethernet switch.

The stand-alone network design allows for auto discovery and setup of all approved connected devices at powerup and requires no networking experience by the installer or user. The device supports password protected administrative and user privileges for the SDX-1000 and individual applications for advanced security and peace-of-mind.

The SDX-1000 is provided with factory installed applications (partial list below). Updates and additional applications to increase functionality are continuously being developed and added to the device[3].

1 Devices with multiple sensor measurements are considered one "device".
2 Visit EBTRON.com/SDPDevices or scan the "DEVICES" QR Code on the previous page for an up-to-date list of compatible devices.
3 Visit EBTRON.com/SDPAppStore or scan the "APPS" QR Code on the previous page for an up-to-date list of applications and updates.

Factory Installed Applications

App Name	Description
Live Display	Display the measurements of up to sixteen devices. Devices having multiple measurements (ex., airflow, temperature, humidity, enthalpy, and dewpoint) are considered one device and are displayed on a single screen. Device hold, continuous advance, or fast forward display through multiple devices are easily selected from the touchscreen. A simple dropdown allows immediate display with hold of any connected device.
Device Config	Configure any parameter of any connected device from the SDX-1000, thus eliminating the need to configure or diagnose the transmitter at the location where it is mounted. As a result, transmitters do not need to be located at eye level or next to the BAS panel. In many cases, this will decrease sensor cable length requirements and save on first costs.
Device Summary	Allows for a quick tabular view of the output of all connected devices on a single, scrollable screen. The app also displays the system status of each connected device.
***EB-Link* Reader**	This is essentially the same as the popular Bluetooth® Low Energy *EB-Link* Reader phone/tablet app for Android® or iOS® systems. View individual sensor data and complete diagnostics of each device connected to the display panel. Save diagnostic data to a USB memory device to export data for records or email data to EBTRON customer service. Ideal for installations that do not permit radio transmission from devices.

SDX-1000 SMART DISPLAY PANEL TECHNICAL SPECIFICATIONS[4]

Display
7" diagonal, full color, capacitive touch display (800x480 resolution)
Operating System, Microcomputer, and Internal Memory
Linux-based 900MHz microcomputer with 512 MB of RAM and 8 GB of flash memory
External Memory (by others)
FAT32 formatted, USB Type A memory device (thumb drive) for upload operating system and installed application updates, new applications, or download of data from specific applications
Environmental Limits
Temperature:
-4 to 120 °F [-20 to 48.89 °C]
Humidity: (non-condensing)
5 to 90%
Connections to Individual Measurement Devices
Protocol: *EB-Bus* Ethernet (dedicated network)
Wiring and Connections: CAT5e or higher cable with standard RJ-45 connectors using theT-568A or T-568B Ethernet wiring convention. Multiple measuring devices shall be connected through a standard Ethernet switch[5]
Max Distance between Devices and/or Switches: 328 ft. [100 m]
Maximum Devices Supported: 20
Communications to B.A.S.
None. Connections are made to separate analog or network outputs of each individual measuring device (refer to the individual measuring device data sheet for BAS connectivity options)
Power Requirement
Barrel Jack, 12VDC (18W Max), 110 VAC adapter power supply provided.
Enclosure
Material: ABS, UL-94 HB
Dimensions: 6.4H x 10.5W x 1.6D in. [162.6H x 266.7W x 0.6D mm]
Listings & Compliance
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

4 Technical specifications subject to change based on component availability.
5 Select an Ethernet switch designed for the temperature range it will be exposed to. Industrial temperature range Ethernet switches are also available from EBTRON or your local EBTRON representative.

HIGH SENSOR DENSITY MULTI-POINT AIRFLOW AND TEMPERATURE MONITORING DEVICE WITH ALARM AND OPTIONAL INTEGRAL HUMIDITY SENSOR

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- Sensor nodes are individually calibrated at 16 airflow rates to NIST traceable standards
- 0 to 5,000 FPM calibrated range with percent-of-reading accuracy
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Optional velocity-weighted humidity/enthalpy and dewpoint measurement
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Independent test data demonstrates resistance to saltwater and chemical exposure
- Standard FEP plenum rated cable between sensor probes and transmitter
- No compromise construction uses gold plated interconnects
- Unsurpassed connectivity options
- *EB-Link* BLE interface to phone or tablet provides real-time monitoring and diagnostics
- Three-year warranty
- Toll-free customer support for the lifetime of the product

PATENTS

- US Patent Nos.: 12,066,199; 12,066,205
- CA Patent Nos.: 3,069,531; 3,169,641
- EP Patent No.: 4081741
- MX Patent No.: 417881

TYPICAL APPLICATIONS

- Outdoor airflow monitoring and control
- Advanced CO2-DCV airflow reset and limit control
- Population-based DCV control
- Air change verification and control
- Differential airflow tracking and pressure control
- System performance monitoring
- Economizer switchover and fault detection

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The GTx116e-P is EBTRON's top-of-the-line airflow monitoring system that also provides velocity-weighted temperature and optional velocity-weighted psychrometric measurements, thus providing a turn-key solution for today's high-performance buildings. Multiple sensor nodes provide accurate measurements of critical airstream parameters. Unsurpassed connectivity options and a "no-compromise" design makes this your best choice for today's high-performance buildings.

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GTx116e-P TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations (max.)
- **Type A Transmitter:** 2 probes x 8 sensor nodes/probe
- **Type B Transmitter:** 4 probes x 4 sensor nodes/probe

Installed Airflow Accuracy
- **Ducts/Plenums:** ±3% of reading
- **Non-ducted OA Intakes:** better than or equal to ±5% of reading

Sensor Node Averaging Method
- **Airflow:** Independent, arithmetic average
- **Temperature:** Independent, velocity weighted average

Listings & Compliance
- **UL:** 60730-1; CAN/CSA-E60730-1
- **CE:** Yes
- **UKCA:** Yes
- **BACnet International:** BTL Listed (GTC116e and GTM116e transmitters)
- **FCC:** This device complies with Part 15 of the FCC rules
- **RoHS:** This device is RoHS2 compliant

Environmental Limits
- **Temperature:**
  - **Probes:** -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]
  - **Transmitter:** -20 to 120 ^{0}F [-28.9 to 48.9 ^{0}C]
- **Humidity:** (non-condensing)
  - **Probes:** 0 to 100%
  - **Transmitter:** 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
- **Self-heated sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe
- **Temperature sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
- **Material:** Glass-filled Polypropylene (Kynar® with /SS option)
- **Sensor Potting Materials:** Waterproof marine epoxy

Sensing Node Internal Wiring
- **Type:** Kynar® coated copper

Airflow Measurement
- **Accuracy:** ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)
- **Calibrated Range:** 0 to 5,000 fpm [25.4 m/s]
- **Calibration Points:** 16

Temperature Measurement
- **Type:** Velocity-weighted average
- **Accuracy:** ±0.15^{0}F [0.08 ^{0}C] to NIST-traceable temperature standards (includes transmitter uncertainty)
- **Calibrated Range:** -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]

Optional Relative Humidity Sensor (/H Option)

Type: Ruggedized capacitive polymer RH sensor

Accuracy @ 77 ^{0}F [25 ^{0}C]
- **20 to 80 %RH:** ±2% RH
- **0 to 20 and 80 to 100 %RH:** ±3.5% RH

Temperature Coefficient: 0.07%/^{0}F [0.13%/^{0}C]

Long Term Drift: 0.5% RH/year

Calculated Measurements: Velocity weighted relative humidity, velocity-weighted enthalpy and dew point using measured RH, velocity-weighted temperature and on-board barometric pressure sensor.

Sensor Probe Assembly

Tube
- **Material:** Gold anodized 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets
- **Material:** 304 stainless steel

Mounting Options & Size Limits
- **Insertion:** 6 to 191in. [152.4 to 4851 mm]
- **Stand-off:** 6 to 190 in. [152.4 to 4826 mm]
- **Internal:** 10 to 194 in. [254.0 to 4928 mm]
- Note: The /H option is only available on probes >18 in.[457.2 mm]

Probe to Transmitter Cables
- **Type:** FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ^{0}F [-55 to 150 ^{0}C], UV tolerant
- **Standard Lengths:** 10, 15, 20, 25, 30, 40 and 50 ft. [3.1, 4.6, 6.1, 7.6, 9.1, 12.2, and 15.2 m]
- **Connecting Plug:** 13/16" [20.63 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @20V-A max.

PCB Connections: Gold-plated PCB interconnects, PCB edge fingers, and test points

User Interface: 2 line x16-character backlit LCD display and 4 button interface

B.A.S. Connectivity Options
- **All Transmitters:** Three field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm, AO3=%RH, enthalpy or dew point when /H option is provided).
- **GTA116e Transmitter:** No additional connectivity to B.A.S.
- **GTC116e Transmitter:** One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network
- **GTB116e Transmitter:** One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection and one additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network
- **GTM116e Transmitter:** One additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network
- **GTF116e Transmitter:** One additional isolated Lonworks Free Topology network connection
- **GTU116e Transmitter:** One additional USB connection for thumb drive data-logging of sensor node airflow rates and temperatures

Alarms
- **Airflow:** Low and/or high user defined setpoint alarm
- **System Status:** Sensor diagnostic system trouble indication

***EB-Link* Bluetooth® low energy Interface for Android® and iPhone®:** Display real-time airflow, velocity-weighted temperature, humidity, enthalpy, dew point, individual sensor node airflow/temperature data, settings and diagnostics[1].

[1] Order with the /NR option when RF devices are not permitted.

AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- Sensor nodes are individually calibrated at 16 airflow rates to NIST traceable standards
- 0 to 5,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Three mounting styles
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Independent test data demonstrates resistance to saltwater and chemical exposure
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Outdoor airflow monitoring
- Small duct airflow tracking
- Hospital pressurization
- Laboratory pressurization
- Air change verification and monitoring
- Differential airflow tracking and pressure control
- System performance monitoring

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The HTx104-P is EBTRON's most economical solution for larger systems when "out-of-the-box" installed accuracy is not required and field adjustment is acceptable. Perfect for LEED outdoor air delivery monitoring or other low sensor density airflow measurement applications. The HTx104-P transmitter has isolated outputs with a true 4-20mA output option (HTA104-P)

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HTx104-P TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations (max.)
- **Type A Transmitter:** 1 probe x 4 sensor nodes/probe
- **Type B Transmitter:** 2 probes x 2 sensor nodes/probe

Installed Airflow Accuracy[1]
- **≤ 2 sq.ft. [0.185 sq.m.]:** ±3% of reading
- **> 2 sq.ft. [0.185 sq.m.]:** ±(3% to 10%), typical (increases with increasing duct size). May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference.

PE Sensor Density: Refer to the PE sensor density table.

Sensor Node Averaging Method
- **Airflow:** Independent, arithmetic average
- **Temperature:** Independent, velocity weighted average

Listings and Compliance
- **UL:** 60730-1; CAN/CSA-E60730-1
- **CE:** Yes
- **UKCA:** Yes
- **BACnet International:** BTL Listed (HTN104 transmitter)
- **FCC:** This device complies with Part 15 of the FCC rules
- **RoHS:** This device is RoHS2 compliant

Environmental Limits
- **Temperature:**
  - **Probes:** -20 to 160 ºF [-28.9 to 71.1 ºC]
  - **Transmitter:** -20 to 120 ºF [-28.9 to 48.9 C]
- **Humidity:** (non-condensing)
  - **Probes:** 0 to 100%
  - **Transmitter:** 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
- **Self-heated sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe
- **Temperature sensor:** Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
- **Material:** Glass-filled Polypropylene (Kynar® with /SS option)
- **Sensor Potting Materials:** Waterproof marine epoxy

Sensing Node Internal Wiring
- **Type:** Kynar® coated copper

Airflow Measurement
- **Accuracy:** ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)
- **Calibrated Range:** 0 to 5,000 fpm [0 to 25.4 m/s]
- **Calibration Points:** 16

Temperature Measurement
- **Type:** Velocity-weighted average
- **Accuracy:** ±0.15 ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
- **Calibrated Range:** -20 to 160 ºF [-28.9 to 71.1 ºC]
- **Calibration Points:** 3

Sensor Probe Assembly

Tube
- **Material:** Gold anodized 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets
- **Material:** 304 stainless steel

Mounting Options & Standard Size Limits[1]
- **Insertion:** 6 to 191in. [152.4 to 4851 mm]
- **Stand-off:** 6 to 190 in. [152.4 to 4826 mm]
- **Internal:** 8 to 194 in. [203.2 to 4928 mm]

Probe to Transmitter Cables
- **Type:** FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
- **Standard Lengths:** 10, 15, 20, 25, 30, 40 and 50 ft. [3.1, 4.6, 6.1, 7.6, 9.1, 12.2 and 15.2 m]
- **Connecting Plug:** 0.60" [15.24 mm] circular DIN

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @11V-A

PCB Connections: Gold-plated PCB interconnects and test points

User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
- **HTA104 Transmitter:** Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm)
- **HTN104 Transmitter:** One field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection- Individual sensor node airflow rates and temperatures are available via the network

Airflow Alarm
- **Type:** Low and/or high user defined setpoint alarm
- **Tolerance:** User defined % of setpoint
- **Delay:** User defined
- **Zero Disable:** Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)
- **Reset Method:** Manual or automatic
- **Visual Indication:** Yes, LCD display
- **Network Indication:** Yes (HTN104 only)
- **Analog Signal Indication:** Yes, on AO2 assignment (HTA104 only)

System Status Alarm
- **Type:** Sensor diagnostic system trouble indication
- **Visual Indication:** Yes, LCD display
- **Network Indication:** Yes (HTN104 only)
- **Analog Signal Indication:** Yes, on AO2 assignment (HTA104 only)

[1] Installed airflow accuracy allows for additional uncertainty that results from averaging a finite number of sensors in a contorted velocity profile created from up and downstream disturbances. The specified installed accuracy is based on the PE sensor density rules for installations that meet or exceed EBTRON minimum placement requirements. PE sensor density rules may not be available for all duct sizes due to sensor placement limitations.

AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- High performance CV/VAV terminal box measurement
- Small duct outdoor air delivery monitoring
- Small duct airflow tracking
- Hospital pressurization
- Laboratory pressurization

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The HTx104-T is EBTRON's measurement solution for round ducts between 4 and 16 inches in diameter when a remote display is desired. Ideal for small duct airflow measurement and airflow tracking applications. The HTx104-T transmitter has isolated outputs with a true 4-20mA output option (HTA104-T).

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HTx104-T TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations (max.)
1 probe x 1 sensor node/probe (4 inch [101.6 mm] probe)
1 probe x 2 sensor nodes/probe (5 to 16 inch [127.0 to 406.4 mm] probes)

Installed Airflow Accuracy[1]
±3% of reading

Sensor Node Averaging Method
Airflow: Independent, arithmetic average
Temperature: Independent, velocity weighted average

Listings and Compliance
UL: 60730-1; CAN/CSA-E60730-1
CE: Yes
UKCA: Yes
BACnet International: BTL Listed (HTN104 transmitter)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Probes: -20 to 160 ºF [-28.9 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 C]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe
Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene (Kynar® with /SS option)
Sensor Potting Materials: Waterproof marine epoxy

Sensing Node Internal Wiring
Type: Kynar® coated copper

Airflow Measurement
Accuracy: ±3% of reading to NIST-traceable volumetric airflow standards (includes transmitter uncertainty)
Calibrated Range: 0 to 3,000 FPM [0 to 15.24 m/s]
Calibration Points: 7

Temperature Measurement
Type: Velocity-weighted average
Accuracy: ±0.15 ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]
Calibration Points: 3

Sensor Probe Assembly

Tube
Material: Mill finish 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets
Material: 304 stainless steel

Mounting Options & Size Limits
Insertion: 4, 5, 6, 7, 8, 9, 10, 12, 14, and 16 inch round [101.6, 127.0, 152.4, 177.8, 203.2, 228.6, 254.0, 304.8, 355.6 & 406.4 mm]

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 3, 10, 25 and 50 ft. [0.9, 3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] circular DIN

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
PCB Connections: Gold-plated PCB interconnects and test points
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
HTA104 Transmitter: Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm)
HTN104 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection- Individual sensor node airflow rates and temperatures are available via the network

Airflow Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes when installation meets or exceeds placement guidelines.

AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Cost effective single probe
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Dry contact relay
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- High performance CV/VAV terminal box measurement
- Small duct outdoor air delivery monitoring
- Small duct airflow tracking
- Hospital pressurization
- Laboratory pressurization

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The EF-x2000-T is EBTRON's measurement solution for round ducts between 4 and 16 inches in diameter when a remote display is desired. Ideal for small duct airflow measurement and airflow tracking applications. The EF-x2000-T's remote transmitter and user interface provides more customization than the EF-x1000-T.

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EF-x2000-T TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations
1 probe x 1 sensor node/probe (4 inch [101.6 mm] probe)
1 probe x 2 sensor nodes/probe (5 to 16 inch [127.0 to 406.4 mm] probes)

Installed Airflow Accuracy[1]
±3% of reading

Sensor Node Averaging Method
Airflow: Independent arithmetic average
Temperature: Independent, velocity weighted average

Listings and Compliance
UL: 60730-1, 60730-2-9; CAN E60730-1, E60730-2-9 (EF-A2000-T Only)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Probes 0 to 2,000 fpm [0 to 10.16 m/s]**:**
-20 to 160 ºF [-28.9 to 71.1 ºC]
Probes 0 to 3,000 fpm [0 to 15.24 m/s]**:**
0 to 160 ºF [-17.8 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 ºC]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe
Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene (Kynar® with /SS option)
Sensor Potting Materials: Waterproof marine epoxy

Sensing Node Internal Wiring
Type: Kynar® coated copper

Airflow Measurement
Accuracy: ±3% of reading to NIST-traceable volumetric airflow standards (includes transmitter uncertainty)
Calibrated Range: 0 to 3,000 FPM [0 to 15.24 m/s]
Calibration Points: 7

Temperature Measurement
Type: Velocity-weighted average
Accuracy: ±0.15ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]
Calibration Points: 3

Sensor Probe Assembly

Tube
Material: Mill finish 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets
Material: 304 stainless steel

Mounting Options & Size Limits
Insertion: 4, 5, 6, 7, 8, 9, 10, 12, 14, and 16 inch round [101.6, 127.0, 152.4, 177.8, 203.2, 228.6, 254.0, 304.8, 355.6 & 406.4 mm]

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 3, 10, 25 and 50 ft. [0.9, 3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
EF-A2000 Transmitter: Two field selectable (0-5/1-5/0-10/2-10 VDC*), scalable and protected analog output signals (AO1=airflow, AO2 = temperature or alarm)
* The VDC output circuit of the EF-A2000 transmitter can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.
EF-N2000 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network (provide individual 24 VAC transformers at each EF-N2000 transmitter for applications requiring isolated RS-485)

Relay
Type: Dry Contact w/ onboard jumper to drive a remote LED (R1=alarm)
Status: N.O. or N.C. via user setup configuration
Rating: 30 VDC or 24 VAC @ 3 amp. max.

Airflow Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes when installation meets or exceeds placement guidelines.

AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

TYPICAL APPLICATIONS

- Smaller openings (≤ 8 sq ft [0.74 sq m]) for outdoor air delivery monitoring where 10% installed accuracy is acceptable
- ERV/HRV outdoor air & exhaust air monitoring
- Classroom unit ventilator outdoor air delivery monitoring

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Single or dual airflow output
- Two mounting styles
- Analog and RS-485 output models
- Dry contact relay
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The EF-x2000-U is a cost effective measurement solution for smaller rooftop packaged units, fan coils and classroom ventilators. Available with adjustable standoff or insertion mount universal probes. Dual airflow output capability makes it ideal for outdoor air and exhaust airflow measurement in RTUs with powered exhaust and in energy/heat recovery ventilators.

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EF-x2000-U TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations
1 probe x 1 sensor node
2 probes x 1 sensor node/probe

Installed Airflow Accuracy[1]
≤ 8 sq.ft. [0.74 sq.m.]: ±(3% to 15%), typical (increases with increasing opening size). May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference.
> 8 sq.ft. [0.74 sq.m.]: Not recommended.

Sensor Node Averaging Method
Airflow: Independent (arithmetic average on 2 sensor configurations installed at a single measurement location)
Temperature: Independent, velocity weighted average on 2 sensor configurations installed at a single measurement location

Listings and Compliance
UL: 60730-1, 60730-2-9; CAN E60730-1, E60730-2-9 (EF-A2000-U Only)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Probes 0 to 2,000 fpm [0 to 10.16 m/s]**:**
-20 to 160 ºF [-28.9 to 71.1 ºF]
Probes 0 to 3,000 fpm [0 to 15.24 m/s]**:**
0 to 160 ºF [-17.8 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 ºC]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe
Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene
Sensor Potting Materials: Waterproof marine epoxy

Sensing Node Internal Wiring
Type: Kynar® coated copper

Airflow Measurement
Accuracy: ±3% of reading (typical), 4% max. to NIST-traceable airflow standards (includes transmitter uncertainty)
Calibrated Range: 0 to 3,000 fpm [0 to 15.24 m/s]
Calibration Points: 7

Temperature Measurement
Type: Velocity-weighted average
Accuracy: ±0.15 ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)

Sensor Probe Assembly

Tube
Material: Mill finish 6063 aluminum

Mounting Brackets
Material: 304 stainless steel

Mounting Options & Overall Probe Length
Insertion: 6, 8 or 16 in. [152.4, 203.2 or 406.4 mm] (adjustable)
Stand-off: 6, 8 or 16 in. [152.4, 203.2 or406.4 mm] (adjustable)

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 10, 25 and 50 ft. [3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
EF-A2000 Transmitter: Two field selectable (0-5/1-5/0-10/2-10 VDC*), scalable and protected analog output signals (AO1 = airflow, airflow1, airflow1-2, or airflow2-1, AO2 = airflow2, airflow1-2, airflow2-1, temperature, or alarm)
* The VDC output circuit of the EF-A2000 transmitter can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.
EF-N2000 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network (provide individual 24 VAC transformers for each EF-N2000 transmitter for applications requiring isolated RS-485)

Relay
Type: Dry Contact w/ onboard jumper to drive a remote LED (R1=alarm)
Status: N.O. or N.C. via user setup configuration
Rating: 30 VDC or 24 VAC @ 3 amp. max.

Airflow Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes when installation meets or exceeds placement guidelines.

AIRFLOW MEASUREMENT WITH TEMPERATURE CAPABILITY

PRODUCT HIGHLIGHTS

- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- 0 to 3,000 FPM calibrated range with percent-of-reading accuracy
- Cost effective single probe
- Velocity pressure output option
- Temperature output models available
- Analog and RS-485 output models
- Duct insertion mounting
- Integral transmitter
- Velocity-weighted temperature measurement between -20° F to 120° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- High performance CV/VAV terminal box measurement
- Small duct outdoor air delivery monitoring
- Small duct airflow tracking
- Hospital pressurization
- Laboratory pressurization

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The EF-x1000-T (ELF) is EBTRON's economical measurement solution for round ducts between 4 and 16 inches in diameter. Ideal for most small duct airflow measurement and airflow tracking applications. Low flow performance, temperature capability and connectivity options make this a better choice than traditional differential pressure averaging arrays, rings and crosses.

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EF-x1000-T TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations
1 probe x 1 sensor node/probe (4 inch [101.6 mm] probe)
1 probe x 2 sensor nodes/probe (5 to 16 inch [127.0 to 406.4 mm] probes)

Installed Airflow Accuracy[1]
±3% of reading

Sensor Node Averaging Method
Airflow: Independent arithmetic average
Temperature: Independent, velocity weighted average

Listings and Compliance
UL: 60730-1; CAN/CSA-E60730-1 (EF-A1000-T/ELF-F0x Only)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Probes 0 to 2,000 fpm [0 to 10.16 m/s]**:**
-20 to 120 ºF [-28.9 to 48.9 ºC]
Probes 0 to 3,000 fpm [0 to 15.24 m/s]**:**
0 to 120 ºF [-17.8 to 48.9 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 ºC]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors
Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe
Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene (Kynar® with /SS option)
Sensor Potting Materials: Waterproof marine epoxy

Sensing Node Internal Wiring
Type: Kynar® coated copper

Airflow Measurement
Accuracy: ±3% of reading to NIST-traceable volumetric airflow standards (includes transmitter uncertainty)
Calibrated Range: 0 to 3,000 fpm [0 to 15.24 m/s]
Calibration Points: 7

Temperature Measurement
Type: Velocity-weighted average
Accuracy: ±0.15ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 120 ºF [-28.9 to 48.9 ºC]
Calibration Points: 3

Sensor Probe Assembly

Tube
Material: Mill finish 6063 aluminum (316 stainless steel with /SS option)

Mounting Brackets
Material: 304 stainless steel

Mounting Options & Size Limits
Insertion: 4, 5, 6, 7, 8, 9, 10, 12, 14, & 16 inch round [101.6, 127.0, 152.4, 177.8, 203.2, 228.6, 254.0, 304.8, 355.6 & 406.4 mm]

Integral Transmitter

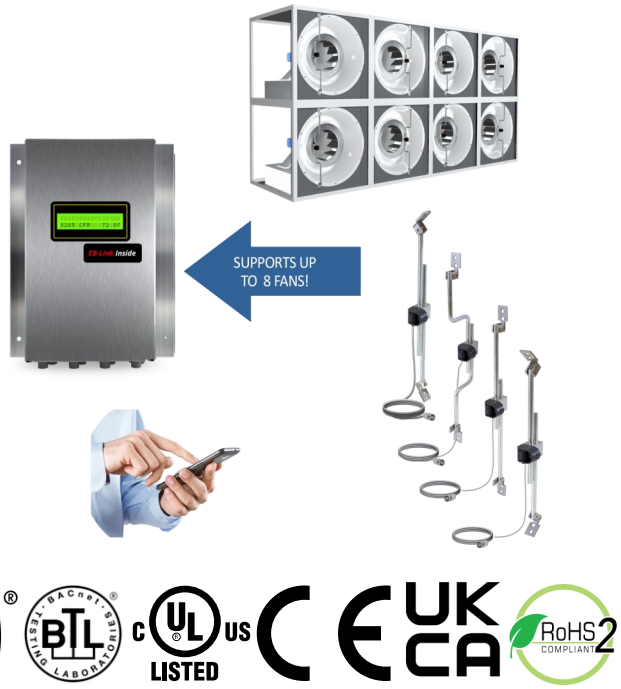
Power Requirement: 24 VAC (22.8 to 26.4 under load) @5V-A
User Interface: DIP switch

B.A.S. Connectivity Options
EF-A1000 Transmitter: One field selectable (0-10/2-10 VDC* or 0-5/1-5 VDC* - specify at time of order), scalable and protected analog output signal (AO1=airflow)
EF-A1001 Transmitter: Two field selectable (0-10/2-10 VDC* or 0-5/1-5 VDC* - specify at time of order), scalable and protected analog output signals (AO1=airflow, AO2 = temperature)
* The VDC output circuit of the EF-A1000 and EF-A1001 transmitters can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.
EF-N1000 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network (provide individual 24 VAC transformers at each EF-N1000 transmitter for applications requiring isolated RS-485)

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LED on circuit board
Network Indication: Yes (EF-N1000 only)

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes when installation meets or exceeds placement guidelines.

FAN AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY



PATENTS

- US Patent Nos.: 12,066,199; 12,066,205
- CA Patent Nos.: 3,069,531; 3,169,641
- EP Patent No.: 4081741
- MX Patent No.: 417881

TYPICAL APPLICATIONS

- Fan airflow tracking
- Air change verification and monitoring
- Individual fan performance monitoring and fault detection
- Air change verification and control

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- Sensor nodes are individually calibrated at 16 airflow rates to NIST traceable standards
- 0 to 10,000 FPM calibrated range with percent-of-reading accuracy
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- No compromise construction uses gold plated interconnects
- Unsurpassed connectivity options
- Four mounting styles
- *EB-Link* BLE interface to phone or tablet provides real-time monitoring and diagnostics
- Three-year warranty
- Toll-free customer support for the lifetime of the product

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The GTx108e-F/SI and GTx108e-F/DI are EBTRON's solution for accurate and repeatable airflow measurement in SWSI and DWDI fans. The GTx108e-F/An is EBTRON's solution for accurate and repeatable airflow measurement in fan arrays. One to eight fans are supported. Airflow, temperature and/or airflow alarming are available on all models. The GTx108e-F/An provides individual fan airflow rates and fan alarming with combination analog output/network models. Does not affect fan performance.

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GTx108e-F TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations

Fan Arrays (less than or equal to 4 fans): 2 probes x 1 sensor node per probe or 1 probe x 1 sensor node per probe in each fan

Fan Arrays (greater than 4 fans): 1 probe x 1 sensor node per probe in each fan (8 probe maximum)

SWSI and DWDI fans: 2 probes x 1 sensor node per probe in each fan inlet

Installed Airflow Accuracy[1]

±(3% to 10%) of reading, depending on fan type and installation. May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference

Sensor Node Averaging Method

Airflow: Independent, arithmetic average per fan

Temperature: Independent, velocity weighted average

Listings & Compliance

UL: 60730-1; CAN/CSA-E60730-1

CE: Yes

UKCA: Yes

BACnet International: BTL Listed (GTC108e and GTM108e transmitters)

FCC: This device complies with Part 15 of the FCC rules

RoHS: This device is RoHS2 compliant

Environmental Limits

Temperature:

Probes: -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]

Transmitter: -20 to 120 ^{0}F [-28.9 to 48.9 ^{0}C]

Humidity: (non-condensing)

Probes: 0 to 100%

Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors

Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing

Material: Glass-filled Polypropylene

Sensor Potting Materials: Waterproof marine epoxy

Airflow Measurement

Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)

Calibrated Range: 0 to 10,000 fpm [0 to 50.8 m/s]

Calibration Points: 16

Temperature Measurement

Type: Velocity-weighted average

Accuracy: ±0.15^{0}F [0.08 ^{0}C] to NIST-traceable temperature standards (includes transmitter uncertainty)

Calibrated Range: -20 to 160 ^{0}F [-28.9 to 71.1 ^{0}C]

Calibration Points: 3

Sensor Probe Assembly

Mounting Rods

Material: Zinc plated steel

Mounting Brackets (Throat, Forward, Face, Flare)

Material: 304 stainless steel

Mounting Options & Size Limits

Throat: 6 to 66 inches [152.4 to 1676.4 mm] (throat diameter)

Face: 11 to 77 inches [279.4 to 1955.8 mm] (diameter at inlet entrance)

Forward: 6 to 64 inches [152.4 to 1625.6 mm] (diameter at inlet entrance)

Flare: 6 to 57 inches [152.4 to 1447.8 mm] (opening size at backdraft damper inlet)

Probe to Transmitter Cables

Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ^{0}F [-55 to 150 ^{0}C], UV tolerant

Standard Lengths: 10, 25, and 50 ft. [3.1, 7.6, and 15.2 m]

Connecting Plug: 9/16" [14.29 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @16V-A

PCB Connections: Gold-plated PCB interconnects, PCB edge fingers, and test points

User Interface: 2 line x16-character backlit LCD display and 4 button interface

B.A.S. Connectivity Options

All Transmitters: Three field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm, AO3=Not Used).

GTA108e Transmitter: No additional connectivity to B.A.S.

GTC108e Transmitter: One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network

GTB108e Transmitter: One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection and one additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network

GTM108e Transmitter: One additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network

GTF108e Transmitter: One additional isolated Lonworks Free Topology network connection

GTU108e Transmitter: One additional USB connection for thumb drive data-logging of sensor node airflow rates and temperatures

Alarms

Airflow: Low and/or high user defined setpoint alarm

Fan (An modelsType): Minimum airflow, % deviation from median airflow, or % deviation from maximum airflow stored in memory

System Status: Sensor diagnostic system trouble indication

***EB-Link* Bluetooth® low energy Interface for Android® and iPhone®:** Download individual sensor node airflow/temperature data, settings and diagnostics[2].

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes.

[2] Order with the /NR option when RF devices are not permitted.

SWSI & DWDI AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- Sensor nodes are individually calibrated at 16 airflow rates to NIST traceable standards
- 0 to 10,000 FPM calibrated range with percent-of-reading accuracy
- Airflow and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Four mounting styles
- Remote transmitter with LCD display
- Actual (CFM) or mass (SCFM) airflow measurement
- Velocity-weighted temperature measurement between -20° F to 160° F
- Smart *Sensor Detection System* (*SDS*) continuously monitors for sensor and transmitter faults
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Fan airflow tracking
- Air change verification and monitoring
- Fan performance monitoring

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The HTx104-F/SI and HTx104-F/DI are EBTRON's most economical solution for accurate and repeatable airflow measurement in SWSI and DWDI fans. Airflow, temperature and/or airflow alarming are available on all models. Does not affect fan performance. The HTx104-F transmitter has isolated outputs with a true 4-20mA output option (HTA104-F).

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HTx104-F TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations

SWSI and DWDI fans: 2 probes x 1 sensor node per probe in each fan inlet

Installed Airflow Accuracy[1]

±(3% to 10%) of reading, depending on fan type and installation. May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference.

Sensor Node Averaging Method

Airflow: Independent, arithmetic average

Temperature: Independent, velocity weighted average

Listings and Compliance

UL: 60730-1; CAN/CSA-E60730-1

CE: Yes

UKCA: Yes

BACnet International: BTL Listed (HTN104 transmitter)

FCC: This device complies with Part 15 of the FCC rules

RoHS: This device is RoHS2 compliant

Environmental Limits

Temperature:

Probes: -20 to 160 ºF [-28.9 to 71.1 ºC]

Transmitter: -20 to 120 ºF [-28.9 to 48.9 ºC]

Humidity: (non-condensing)

Probes: 0 to 100%

Transmitter: 5 to 95%

Individual Sensing Nodes

Sensing Node Sensors

Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor

Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor

Sensing Node Housing

Material: Glass-filled Polypropylene

Sensor Potting Materials: Waterproof marine epoxy

Airflow Measurement

Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)

Calibrated Range: 0 to 10,000 fpm [0 to 50.8 m/s]

Calibration Points: 16

Temperature Measurement

Type: Velocity-weighted average

Accuracy: ±0.15ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)

Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]

Calibration Points: 3

Sensor Probe Assembly

Mounting Rods

Material: Zinc plated steel

Mounting Brackets (Throat, Forward, Face, Flare)

Material: 304 stainless steel

Mounting Options & Size Limits

Throat: 6 to 66 inches [152.4 to 1676.4mm] (throat diameter)

Forward: 6 to 64 inches [152.4 to 1625.6 mm] (diameter at inlet entrance)

Face: 11 to 77 inches [279.4 to 1955.8] (diameter at inlet entrance)

Flare: 6 to 57 inches [152.4 to 1447.8 mm] (opening size at backdraft damper inlet)

Probe to Transmitter Cables

Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant

Standard Lengths: 10, 25, and 50 ft. [3.1, 7.6 and 15.2 m]

Connecting Plug: 0.60“ [15.24 mm] circular DIN

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @11V-A

PCB Connections: Gold-plated PCB interconnects and test points

User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options

HTA104 Transmitter: Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm)

HTN104 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection- Individual sensor node airflow rates and temperatures are available via the network

Airflow Alarm

Type: Low and/or high user defined setpoint alarm

Tolerance: User defined % of setpoint

Delay: User defined

Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods)

Reset Method: Manual or automatic

Visual Indication: Yes, LCD display

Network Indication: Yes (HTN104 only)

Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

System Status Alarm

Type: Sensor diagnostic system trouble indication

Visual Indication: Yes, LCD display

Network Indication: Yes (HTN104 only)

Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

[1] Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes.

BLEED AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- Detect ΔP as low as 0.0002" H_20
- Uni- or bi-directional measurement
- Airflow (or ΔP) and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Three mounting kits available
- 1/2" NPT female pipe connections
- Remote transmitter with LCD display
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Ultra-low pressure detection
- Parking garage pressurization
- Construction zone contaminant containment
- Stairwell pressurization
- Relief and exhaust damper control
- Airflow across a louver or other fixed opening

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The HTx104-B is a unique measurement device that can detect very small pressure differentials (as low as 0.0002" H2O) between two adjacent spaces by sensing the airflow rate induced by the pressure gradient. The HTx104-B can be used to determine the airflow rate across fixed openings when a reference airflow rate is provided. The HTx104-B transmitter has isolated outputs with a true 4-20mA output option (HTA104-B).

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HTx104-B TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configurations
1 bi-directional, dual 1/2" NPT female bleed sensor housing

Installed Accuracy
Airflow through an opening or across an obstruction: Requires field measurement of a reference airflow of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.
Equivalent pressure between two adjacent spaces: Requires field measurement of a reference pressure to correct the default flow coefficient of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.

Listings and Compliance
UL: 60730-1; CAN/CSA-E60730-1
CE: Yes
UKCA: Yes
BACnet International: BTL Listed (HTN104 transmitter)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Sensor: -20 to 160 ºF [-28.9 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 C]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Bleed Sensor Assembly

Sensing Node Sensors
Self-heated sensor: Two precision, hermetically sealed, bead-in-glass thermistor probes
Temperature sensor: One precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene
Sensor Potting Materials: Waterproof marine epoxy

Airflow Measurement
Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)
Calibrated Range: -3,000 to 3,000 fpm [-15.24 to 15.24 m/s]
Calibration Points: 9

Temperature Measurement
Accuracy: ±0.15ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]
Calibration Points: 3

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 10, 25 and 50 ft. [3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] nominal diameter

Transmitter

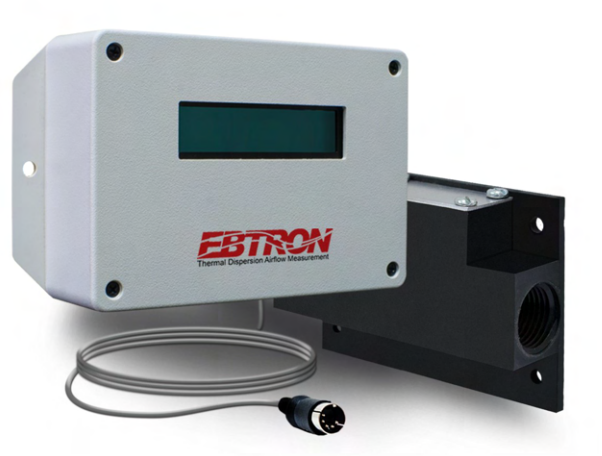
Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
PCB Connections: Gold-plated PCB interconnects and test points
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
HTA104 Transmitter: Two field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow or equivalent ΔP, AO2=temperature or alarm)
HTN104 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection- Individual sensor node airflow rates and temperatures are available via the network

Airflow (or Pressure) Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (HTN104 only)
Analog Signal Indication: Yes, on AO2 assignment (HTA104 only)

BLEED AIRFLOW MEASUREMENT WITH TEMPERATURE AND ALARM CAPABILITY



PRODUCT HIGHLIGHTS

- *"Plug and Play"* operation
- EBTRON exclusive bead-in-glass thermistor sensors
- NIST traceable calibration
- Detect ΔP as low as 0.0002" H_20
- Uni- or bi-directional measurement
- Airflow (or ΔP) and status alarm
- Temperature output capability
- Analog and RS-485 output models
- Dry contact relay
- Three mounting kits available
- 1/2" NPT female pipe connections
- Remote transmitter with LCD display
- Standard FEP plenum rated cable between sensor probes and transmitter
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Ultra-low pressure detection
- Parking garage pressurization
- Construction zone contaminant containment
- Stairwell pressurization
- Relief and exhaust damper control
- Airflow across a louver or other fixed opening

EBTRON ADVANCED THERMAL DISPERSION TECHNOLOGY

EBTRON pioneered bead-in-glass thermistor based thermal dispersion over 40 years ago. EBTRON's thermal dispersion technology relates the power dissipated by a self-heated thermistor to the airflow rate at one or more sensor nodes in an airstream. All EBTRON airflow monitoring systems use this time-tested thermal dispersion technology.

MODEL DESCRIPTION

The EF-x2000-B is a unique measurement device that can detect very small pressure differentials (as low as 0.0002" H2O) between two adjacent spaces by sensing the airflow rate induced by the pressure gradient. The EF-x2000-B can be used to determine the airflow rate across fixed openings when a reference airflow rate is provided.

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EF-x2000-B TECHNICAL SPECIFICATIONS

General

Probe and Sensor Node Configuration
1 bi-directional, dual 1/2" NPT female bleed sensor housing

Installed Accuracy
Airflow through an opening or across an obstruction: Requires field measurement of a reference airflow of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.
Equivalent pressure between two adjacent spaces: Requires field measurement of a reference pressure to correct the default flow coefficient of the specific installation. The Field Adjust Wizard (FAW) facilitates setup.

Listings and Compliance
UL: 60730-1, 60730-2-9; CAN E60730-1, E60730-2-9 (EF-A2000-B Only)
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits
Temperature:
Sensor -2,000 to 2,000 fpm [-10.16 to 10.16 m/s]**:** -20 to 160 ºF [-28.9 to 71.1 ºC]
Sensor -3,000 to 3,000 fpm [-15.24 to 15.24 m/s]**:** 0 to 160 ºF [-17.8 to 71.1 ºC]
Transmitter: -20 to 120 ºF [-28.9 to 48.9 C]
Humidity: (non-condensing)
Probes: 0 to 100%
Transmitter: 5 to 95%

Bleed Sensor Assembly

Sensing Node Sensors
Self-heated sensor: Two precision, hermetically sealed, bead-in-glass thermistor probes
Temperature sensor: One precision, hermetically sealed, bead-in-glass thermistor probe

Sensing Node Housing
Material: Glass-filled Polypropylene
Sensor Potting Materials: Waterproof marine epoxy

Airflow Measurement
Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty)
Calibrated Range: -3,000 to 3,000 fpm [-15.24 to 15.24 m/s]
Calibration Points: 9

Temperature Measurement
Accuracy: ±0.15ºF [0.08 ºC] to NIST-traceable temperature standards (includes transmitter uncertainty)
Calibrated Range: -20 to 160 ºF [-28.9 to 71.1 ºC]
Calibration Points: 3

Probe to Transmitter Cables
Type: FEP jacket, plenum rated CMP/FT6/CL2P, UL/cUL listed, -67 to 302 ºF [-55 to 150 ºC], UV tolerant
Standard Lengths: 10, 25 and 50 ft. [3.1, 7.6 and 15.2 m]
Connecting Plug: 0.60" [15.24 mm] nominal diameter

Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @8V-A
User Interface: 16-character LCD display and 4 button interface

B.A.S. Connectivity Options
EF-A2000 Transmitter: Two field selectable (0-5/1-5/0-10/2-10 VDC*), scalable and protected analog output signals (AO1=airflow or equivalent ΔP, AO2=temperature or alarm)
* The VDC output circuit of the EF-A2000 transmitter can drive the input circuit of devices designed to measure 4-wire current loops with a resistive load ≥250 ohms.
EF-N2000 Transmitter: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network (provide individual 24 VAC transformers for each EF-N2000 transmitter for applications requiring isolated RS-485)

Relay
Type: Dry Contact w/ onboard jumper to drive a remote LED (R1=alarm)
Status: N.O. or N.C. via user setup configuration
Rating: 30 VDC or 24 VAC @ 3 amp. max.

Airflow (or Pressure) Alarm
Type: Low and/or high user defined setpoint alarm
Tolerance: User defined % of setpoint
Delay: User defined
Reset Method: Manual or automatic
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

System Status Alarm
Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LCD display
Network Indication: Yes (EF-N2000 only)
Analog Signal Indication: Yes, on AO2 assignment (EF-A2000 only)
Contact Closure Relay: Yes, on R1 assignment

WALL-MOUNTED RS-485 COMBINATION SENSOR WITH CO_2, TEMPERATURE AND RELATIVE HUMIDITY CAPABILITY

PRODUCT HIGHLIGHTS

- Up to 3 sensors in one package
- Telaire NDIR CO_2 sensor
- Self-calibrating ABC logic circuitry for CO_2 measurement
- Planar capacitive polymer RH sensor
- Integral bandgap PTAT temp. sensor
- Accurate measurement
- Reliable design
- RS-485 BACnet/Modbus connection
- BTL listed
- Attractive wall-mount enclosure
- One-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Room CO_2, relative humidity and temperature monitoring
- CO_2 Demand Control Ventilation (DCV)
- CO_2/airflow population estimation DCV when an airflow monitoring device is provided

MODEL DESCRIPTION

The IAQSENS family of wall mounted devices simplifies wiring and installation by providing up to three sensors over a single RS-485 connection. The device is available as a stand-alone CO_2 sensor, dual output RH/Temperature sensor or a combination of all three.

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IAQ-Ny00-W TECHNICAL SPECIFICATIONS

General

Sensor Configurations

CO_2 only - IAQ-N100-W
RH and Temperature only - IAQ-N200-W
CO_2, RH and Temperature - IAQ-N300-W

Listings and Compliance

BACnet International: BTL Listed
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant

Environmental Limits (Recommended)

Temperature: 32 to 122 ºF [0 to 50 °C]
Humidity: 5 to 95%

Sensors

CO_2 Sensor

Technology: Telaire 6613 Non Dispersive Infrared (NDIR)
Range: 0 to 2,000 ppm
Accuracy:
400 to 1,250 ppm ±30 ppm or 3% of reading, whichever is greater
1,250 to 2,000 ppm ±30 ppm
Temperature Dependence: 0.36% FS/°F [0.2% FS/°C]
Stability: <2% of FS over life of sensor (15 year typical)
Calibration Interval: Not required
Response Time: <2 minutes for 90% step change typical

Temperature Sensor

Technology: Integral Bandgap PTAT
Range: 32 to 122 ºF [0 to 50 °C]
Accuracy: ±1.08 ºF [0.6 °C] @77 ºF [25 °C]
Resolution: 0.36 ºF [0.2 °C]

Relative Humidity Sensor

Technology: Planar Capacitive Polymer
Range: 0 to 100% RH
Accuracy:
±3% <20% RH
±2% 20% to 80% RH
±3% >80% RH
Resolution: 0.4% RH

Integral Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @1.5V-A
User Interface: DIP switch

B.A.S. Connectivity Options

IAQ-N100, IAQ-N200, IAQ-N300 Transmitters: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection (provide individual 24 VAC transformers at each IAQ-Ny00 for applications requiring isolated RS-485)
Supported Baud Rates: 9.6, 19.2, 38.4 and 76.8 kbaud

System Status Alarm

Type: Sensor diagnostic system trouble indication
Visual Indication: Yes, LED indication
Network Indication: Yes

Enclosure

Dimensions: 4.56H x 3.25W x 1.09D in. [115.8 x 82.6 x 27.7 mm]

THERMAL IMAGING OCCUPANCY COUNTER FOR SINGLE WIDTH INTERIOR DOORS

PRODUCT HIGHLIGHTS

- Thermal imaging technology
- Bi-directional counting
- Ideal for single entry doors
- 5% or better typical counting accuracy
- Advanced algorithm reduces false counts
- Compatible with BRG-N100 when no B.A.S. network is available
- RS-485 network connection
- Analog output connection
- Install over door opening
- Door jamb or stand-off mounting
- Operates on 24 VAC power
- Three-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Classrooms
- Lecture halls
- Conference rooms
- Waiting rooms
- Libraries
- Retail spaces
- Arenas or exhibition spaces with channeled entry paths

MODEL DESCRIPTION

The CENSus-C100 is a unique solution for reliable and cost effective occupancy counting. Ideal for Demand Control Ventilation (DCV) applications. Ideal for single entry interior doors or openings. Multiple counters can be installed on rooms with more than one entry.

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CENSUS-C100 TECHNICAL SPECIFICATIONS

General

Counting Technology: Dual sensor differential thermal imaging
Accuracy: Typically better than ±5% of actual population or 3 people, whichever is greater, on openings less than or equal to 42 in. [1.07m]
Listings and Compliance
FCC: This device complies with Part 15 of the FCC rules
RoHS: This device is RoHS2 compliant
Environmental Limits
Temperature (recommended limits): 65 to 85 ºF [18.3 to 29.4 ºC]
Humidity: 5 to 95%

Sensor Assembly

Sensors: Two thermopile sensors
Mounting Options:
Standard: Install on overhead door jamb
Optional: Install above door opening with optional stand-off bracket
Maximum Recommended Mounting Height: 96 in. [2.43 m]

Integral Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @1.5V-A
B.A.S. Connectivity Options
CENSUS-C100: One 0-10 VDC, scalable and protected analog output signal (AO1=occupancy count) and one field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection (provide individual 24 VAC transformers for each CENSUS-C100 device for applications requiring isolated RS-485)

Enclosure

Enclosure: White powder coated formed aluminum

RS-485 NETWORK BRIDGE WITH CONFIGURABLE DISPLAY AND ALARM CAPABILITY

PRODUCT HIGHLIGHTS

- Analog input to RS-485 bridge
- Make any sensor a network sensor
- Accurate voltage measurement
- Scalable signal conversion
- Display custom units of measure
- Simple pushbutton interface
- RS-485 BACnet/Modbus connection
- Substitute BACnet AI for analog voltage
- Fixed or % tolerance alarming
- Dry contact relay
- One-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Analog signal to RS-485 network bridge
- Remote display for RS-485 or analog signal device
- Low/High setpoint alarm

MODEL DESCRIPTION

The BRG-N100 functions as an analog input to RS-485 network bridge. It supports both BACnet MS/TP and Modbus RTU. In addition, it can bind to a remote BACnet object (AO, AI or AV) to read BACnet devices without a dedicated B.A.S. network.

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EBTRON.com
sales@ebtron.com

BRG-N100 TECHNICAL SPECIFICATIONS

General

User Interface: 16-character LCD display and 4 button interface

Input

Type: Analog Input (AI1)

Ranges:

Voltage: 0-10 VDC

Current: 4-20mA (from 4 wire source, no excitation voltage)

B.A.S. Connectivity Options

BRG-N100 Bridge: One field selectable (BACnet MS/TP or Modbus RTU) and non-isolated RS-485 network connection for the scaled network value of AI1, including units of measure - A remote BACnet network object (AO, AI or AV) may be substituted for the physical analog input (AI1) in applications that require an RS-485 BACnet device be read without a B.A.S. network. Note: this functionality is not available for Modbus devices. Provide individual 24 VAC transformers at each BRG-N100 bridge for applications requiring isolated RS-485.

Relay

Type: Dry contact w/ onboard jumper to drive a remote LED (R1=alarm)

Status: N.O. or N.C. via user setup configuration

Rating: 30 VDC or 24 VAC @ 3 amp. Max.

Analog Input (AI1) Alarm

Type: Low and/or high user defined setpoint alarm

Tolerance: User defined % of setpoint or fixed value setpoint

Delay: User defined

Reset Method: Manual or automatic

Visual Indication: Yes, LCD display and red indicating LED

Network Indication: Yes

Contact Closure Relay Assignment: Yes, R1

Listings and Compliance

FCC: This device complies with Part 15 of the FCC rules

RoHS: This device is RoHS2 compliant

Environmental Limits

Temperature: -20 to 120 ºF [-28.9 to 48.9 ºC]

Humidity: 5 to 95% (non-condensing)

Power Requirement: 24 VAC (22.8 to 26.4 under load) @2.5V-A

Dimensions: 3.57H x 6.00W x 1.58D in. [90.7 x 152.4 x 40.1 mm]

ANALOG INPUT SIGNAL "SMART RELAY" THRESHOLD ALARM WITH LOCAL LED INDICATION

RoHS 2 COMPLIANT

PRODUCT HIGHLIGHTS

- Comparison threshold alarm
- LED alarm indication
- Dry contact N.O. relay
- Trigger with an analog DC signal
- Input range 0-10 VDC or 4-20 mA
- Activation trigger > 3 VDC or 6 mA
- Ideal for Advantage IV products
- Convert AO alarm to LED/relay alarm
- Simple terminal block connections
- One-year warranty
- Toll-free customer support for the lifetime of the product

TYPICAL APPLICATIONS

- Convert analog signal alarms to visual or contact closure alarm
- Gold & Hybrid transmitter enhanced alarming

MODEL DESCRIPTION

The ALRT-100 accepts a binary analog output signal for applications requiring local or remote visual or contact closure alarming. The device provides a visual LED indication as well as a contact closure relay capable of passing up to 3 amps at 30VDC or 24 VAC.

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ALRT-100 TECHNICAL SPECIFICATIONS

General

Input
- **Type:** Analog input (AI1)
- **Ranges:**
  - **Voltage:** 0-10 VDC
  - **Current:** 4-20 mA (from 4 wire source, no excitation voltage)

Relay:
- **Type:** Dry contact w/onboard jumper to drive a remote LED (R1=Alarm)
- **Status:** N.O.
- **Rating:** 30 VDC or 24 VAC @ 3 amp. Max.

Analog Input (AI1) Threshold Alarm
- **Type:** Threshold alarm on AI1 > comparison threshold
- **Comparison Threshold:**
  - **Voltage:** Fixed at 3 VDC
  - **Current:** Fixed at 6 mA
- **Delay:** None
- **Reset Method:** Automatic
- **Visual Indication:** Yes, red LED
- **Contact Closure Relay Assignment:** Yes, R1

Listings and Compliance
- **FCC:** This device complies with Part 15 of the FCC rules
- **RoHS:** This device is RoHS2 compliant

Environmental Limits
- **Temperature:** -20 to 120 ºF [-28.9 to 48.9 ºC]
- **Humidity:** 5 to 95% (non-condensing)

Power Requirement: 24 VAC (22.8 to 26.4 under load) @1.5V-A

Dimensions: 3.36H x 4.25W x 1.36D in. [85.2x108.0 x 34.5 mm]